

What is claimed is:

1. A polishing method for polishing a workpiece, comprising:
pressing a workpiece against a polishing surface of a
5 polishing tool containing a resin to bring the workpiece into
sliding contact with said polishing tool, thereby polishing the
workpiece with abrasive particles;

wherein at least a part of said polishing tool is kept at
a temperature equal to or lower than a glass transition temperature
10 of said polishing tool.

2. A method according to claim 1, wherein said polishing
surface of said polishing tool is kept at said temperature equal
to or lower than the glass transition temperature of said polishing
15 tool.

3. A method according to claim 1, wherein a table or a base
plate on which said polishing tool is mounted is cooled to cool
said polishing tool or regulate the temperature of said polishing
20 tool to said temperature equal to or lower than the glass transition
temperature of said polishing tool.

4. A method according to claim 1, wherein a polishing liquid
having a temperature equal to or lower than the glass transition
25 temperature of said polishing tool is supplied to said polishing
surface while the workpiece is being polished.

5. A method according to claim 4, wherein said polishing

liquid comprises cold water or a chemical liquid.

6. A method according to claim 1, wherein a dressing liquid having a temperature equal to or lower than the glass transition temperature of said polishing tool is supplied to said polishing surface while said polishing surface is being dressed.

7. A method according to claim 1, wherein a surface of the workpiece being polished is cooled to cool the surface of the workpiece or to regulate the temperature of the surface of the workpiece, thereby cooling said polishing tool or regulating the temperature of said polishing tool to said temperature equal to or lower than the glass transition temperature of said polishing tool.

15

8. A method according to claim 1, further comprising:

holding a processing assistance member in contact with said polishing surface; and

cooling said processing assistance member or regulating the temperature of said processing assistance member to keep said polishing tool at said temperature equal to or lower than the glass transition temperature of said polishing tool.

9. A method according to claim 8, wherein said processing assistance member comprises a dresser for dressing said polishing tool or a member attached to said dresser, said dresser or said member being held in contact with said polishing tool.

10. A method according to claim 8, wherein said processing assistance member is operable independently of said dresser and a holder for holding the workpiece, and said processing assistance member is held in contact with said polishing tool.

5

11. A method according to claim 8, wherein said processing assistance member is attached to a holder for holding the workpiece and held in contact with said polishing tool.

10 12. A polishing method for polishing a workpiece, comprising:

pressing a workpiece against a polishing surface of a polishing tool containing a resin to bring the workpiece into sliding contact with said polishing tool, thereby polishing the
15 workpiece with abrasive particles;

wherein a processing circumstance is kept at a temperature equal to or lower than a glass transition temperature of said polishing tool.

20 13. A polishing apparatus for polishing a workpiece, comprising:

a polishing tool containing a resin;

a holder for holding and pressing a workpiece against said polishing tool to bring the workpiece into sliding contact with
25 said polishing tool, thereby polishing the workpiece with abrasive particles;

a temperature regulating device for keeping said polishing tool at a temperature equal to or lower than a glass transition

temperature of said polishing tool.

14. An apparatus according to claim 13, wherein said temperature regulating device cools a table or a base plate on
5 which said polishing tool is mounted to cool said polishing tool or regulate the temperature of said polishing tool to said temperature equal to or lower than the glass transition temperature of said polishing tool.

10 15. An apparatus according to claim 13, wherein a polishing liquid having a temperature equal to or lower than the glass transition temperature of said polishing tool is supplied to said polishing surface while the workpiece is being polished.

15 16. An apparatus according to claim 15, wherein said polishing liquid comprises cold water or a chemical liquid.

17. An apparatus according to claim 13, wherein a surface
20 of the workpiece being polished is cooled to cool the surface of the workpiece or to regulate the temperature of the surface of the workpiece, thereby cooling said polishing tool or regulating the temperature of said polishing tool to said temperature equal to or lower than the glass transition temperature of said polishing tool.

25

18. An apparatus according to claim 13, further comprising:
a processing assistance member which is brought in contact
with said polishing surface; and

a temperature regulating device for cooling said processing assistance member or regulating the temperature of said temperature regulating device to keep said polishing tool at said temperature equal to or lower than the glass transition
5 temperature of said polishing tool.

19. An apparatus according to claim 18, wherein said processing assistance member comprises a dresser for dressing said polishing tool or a member attached to said dresser, said
10 dresser or said member being held in contact with said polishing tool.

20. An apparatus according to claim 18, wherein said processing assistance member is operable independently of said
15 dresser and a holder for holding the workpiece, and said processing assistance member is held in contact with said polishing tool.

21. An apparatus according to claim 18, wherein said processing assistance member is attached to a holder for holding
20 the workpiece and held in contact with said polishing tool.

22. A method of manufacturing a polishing tool, comprising:
drying a mixed liquid including a resin and chemical agents
to form a dried solid material; and
25 compressing and forming said dried solid material with heat
into a polishing tool;

wherein said drying temperature is lower than the temperature of said compressing and forming.

23. A method according to claim 22, wherein said mixed liquid includes abrasive particles.

5 24. A method of manufacturing a polishing tool, comprising:
drying a mixed liquid including a resin and chemical agents
to form a dried solid material; and

compressing and forming said dried solid material with heat
into a polishing tool;

10 wherein the temperature of said compressing and forming
is higher than a glass transition temperature of said resin or
a dissolution temperature of said resin.

25. A method according to claim 24, wherein said mixed liquid
15 includes abrasive particles.

26. A method of manufacturing a polishing tool, comprising:
drying a mixed liquid including a resin and chemical agents
to form a dried solid material; and

20 compressing and forming said dried solid material with heat
into a polishing tool;

wherein a resin solvent is added to said mixed liquid.

27. A method according to claim 26, wherein said mixed liquid
25 includes abrasive particles.

28. A method of manufacturing a polishing tool, comprising:
drying a mixed liquid including a resin and chemical agents

to form a dried solid material; and

compressing and forming said dried solid material with heat
into a polishing tool;

wherein an organic solvent or a foaming agent is added to
5 said dried solid material.

29. A method according to claim 28, wherein said mixed liquid
includes abrasive particles.